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(19)日本国特許庁 (J P)

(12) 公 開 特 許 公 報 (A)

(11)特許出願公開番号

特開2003-7164

(P2003-7164A)

(43)公開日 平成15年1月10日(2003.1.10)

(51)Int.Cl. <sup>7</sup>	識別記号	F I	ターミナル*(参考)
H 0 1 H 13/14		H 0 1 H 13/14	B 2 F 0 0 2
G 0 4 G 1/00	3 0 5	G 0 4 G 1/00	3 0 5 B 5 G 0 0 6
H 0 1 H 3/20		H 0 1 H 3/20	C

審査請求 有 請求項の数12 O L (全 8 頁)

(21)出願番号 特願2001-185122(P2001-185122)

(22)出願日 平成13年6月19日(2001.6.19)

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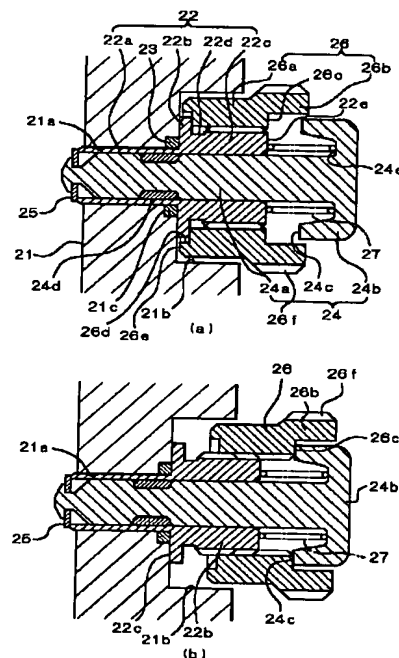
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(54)【発明の名称】 ボタン構造及びこれを備えた携帯機器

(57)【要約】

【課題】 ロック機能付きのボタン構造の操作性を向上させる。

【解決手段】 胴21の貫通孔21aにはパイプ部材22が固定され、パイプ部材22の外側部22cにロック部材26の内側部26aが螺合している。パイプ部材22内にはボタン部材24が摺動可能に挿通され、その頭部24bとパイプ部材22との間に弾性部材27が収容されている。ロック部材26には規制面26cが設けられ、この規制面26cがボタン部材24の頭部24bの内端面24cに当接することによりボタン操作がロックされる。



## 【特許請求の範囲】

【請求項1】 基体に対して出沒可能に取り付けられた軸部、及び、該軸部の外端にて拡径した頭部を備えたボタン部材と、

前記基体若しくは前記基体に固定された固定部材に螺合し、その螺合深さに応じて前記基体に対して出沒動作するように構成され、既定の螺合状態において前記頭部に当接して前記ボタン部材の出沒動作を規制するロック部材と、

前記ボタン部材の頭部と前記基材との間、又は前記ボタン部材の頭部と前記固定部材との間に収容された弾性部材と、を有することを特徴とするボタン構造。

【請求項2】 基体に対して出沒自在に取り付けられた軸部、及び、該軸部の外端にて拡径した頭部を備えたボタン部材と、

前記基体若しくはこれに固定された固定部材に螺合し、その螺合深さに応じて前記基体に対して出沒動作するように構成され、既定の螺合状態において前記頭部に当接して前記ボタン部材の出沒動作を規制するロック部材と、を有し、

前記ボタン部材の前記頭部の内端面の一部に対してのみ前記ロック部材の規制面が当接するように構成されていることを特徴とするボタン構造。

【請求項3】 前記ボタン部材の前記頭部と前記ロック部材との当接部位の径位置と、前記ロック部材と前記基体との螺合部位、又は前記ロック部材と前記固定部材との螺合部位の径位置とがほぼ等しいことを特徴とする請求項1又は請求項2に記載のボタン構造。

【請求項4】 基体に対して出沒自在に取り付けられた軸部、及び、該軸部の外端にて拡径した頭部を備えたボタン部材と、

前記基体若しくは前記基体に固定された固定部材に螺合し、その螺合深さに応じて前記基体に対して出沒動作するように構成され、既定の螺合状態において前記頭部に当接して前記ボタン部材の出沒動作を規制するロック部材と、を有し、

前記ボタン部材の前記頭部と前記ロック部材との当接部位の径位置と、前記ロック部材と前記基体若しくは前記固定部材との螺合部位の径位置とがほぼ等しいことを特徴とするボタン構造。

【請求項5】 前記ロック部材の内端に凹溝若しくは内周側に開いた片凹溝が設けられ、該凹溝若しくは片凹溝の内面と前記基体若しくは前記固定部材とが当接することにより、前記ロック部材のそれ以上の没入動作が規制されるように構成されていることを特徴とする請求項1乃至請求項4のいずれか1項に記載のボタン構造。

【請求項6】 前記ロック部材には、前記ボタン部材の前記頭部に対する規制部位よりもさらに外側に突出し、前記ロック部材の突出状態において前記頭部を包囲する外側包囲部を有することを特徴とする請求項1乃至請求

項5のいずれか1項に記載のボタン構造。

【請求項7】 前記基体には前記固定部材が固定され、前記ボタン部材は前記固定部材に挿通された状態で軸線方向に摺動可能に取り付けられているとともに、前記ロック部材が前記固定部材に螺合するように構成されていることを特徴とする請求項1乃至請求項6のいずれか1項に記載のボタン構造。

【請求項8】 前記固定部材は前記基体に挿通される小径筒部と、該小径筒部の外側にて外周側に張り出し、その内側面が前記基体に当接したフランジ部と、該フランジ部よりも外側に設けられた前記ロック部材に螺合可能なネジ形成部とを有することを特徴とする請求項7に記載のボタン構造。

【請求項9】 前記固定部材は、前記小径筒部の外周面と前記フランジ部の内側面の双方が前記基体に対して当接した状態で固着されていることを特徴とする請求項8に記載のボタン構造。

【請求項10】 前記ロック部材の内端に内周側に開いた片凹溝が設けられ、該片凹溝の内面と前記フランジ部とが当接することにより、前記ロック部材のそれ以上の没入動作が規制されるように構成されていることを特徴とする請求項8又は請求項9に記載のボタン構造。

【請求項11】 前記フランジ部と前記ネジ形成部との間に環状溝が形成されていることを特徴とする請求項8乃至請求項10のいずれか1項に記載のボタン構造。

【請求項12】 請求項1乃至請求項11のいずれか1項に記載のボタン構造を有する携帯機器。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明はボタン構造及びこれを備えた携帯機器に係り、特に、携帯時計その他の携帯機器に設けられる場合に好適なボタン構造に関する。

【0002】

【従来の技術】一般に、腕時計や懐中時計などの携帯時計、ストップウォッチ、ダイビングコンピュータなどの各種携帯機器においては、本体の外面に操作ボタンが設けられる場合がある。操作ボタンにおいては、通常、本体外面から僅かに突出するようにボタン部材が本体に対して出沒可能に取り付けられ、このボタン部材を押圧することによって本体内の接点などが動作するように構成されている。操作ボタンには、誤操作を防止するためにボタン部材の押圧動作を規制するロック機構が設けられる場合がある。

【0003】図3は従来の携帯時計（腕時計）における時計本体を構成する胴の側部を拡大して示す拡大断面図である。なお、軸線Sの図示上方と図示下方は相互に異なる状態を示してある。胴11の側部には貫通孔11aが形成され、この貫通孔11aの外側には拡径した拡径穴部11bが設けられている。貫通孔11aには円筒状のパイプ部材12が挿通され、片凹溝11c内にリング

状のロウ材13を入れて加熱することによって胴11とパイプ部材12とが固着状態となるように接合されている。

【0004】パイプ部材12には、ボタン部材14の軸部14aがバッキン14dを装着した状態で挿通され、軸線方向に摺動可能に取り付けられている。ボタン部材14には、軸部14aの外端において拡張した頭部14bが設けられている。ボタン部材14の軸部14aの内端には止め輪15が装着され、この止め輪15は胴11の内部に突出した状態で上記パイプ部材12の内端に係合し、ボタン部材14が胴11から外側へ抜け出ないようにしている。

【0005】ボタン部材14の軸部14aは段付き円筒状のロック部材16を余裕を持って挿通している。ロック部材16は、内側部16aと、この内側部16aよりも大きな径を持つ外側部16bとを有する段付き形状を有し、内側部16aと外側部16bとの間に外側に向けた規制面16cを備えている。また、内側部16aの内周面には雌ネジが形成され、上記パイプ部材12において貫通孔11aの小径部分から拡張穴部11b内に突出した外端部12aの外周面に形成された雄ネジに対して螺合している。さらに、ボタン部材14の頭部14bの内側溝部14eと、ロック部材16の規制面16cの内端部16dとの間には、コイルバネからなる弾性部材17が圧縮状態で収容されている。

【0006】このロック機構付きの操作ボタンは、図示軸線Sより図示上方に示すようにロック部材16を深くねじ込んだ状態では、ボタン部材14の頭部14bを押圧すると、弾性部材17を押し縮めながらボタン部材14が胴11に没するように軸線方向に摺動し、胴11の内部に配置された接点バネ18などを動作させるように構成されている。また、図示軸線Sより図示下方に示すようにロック部材16を引き出すと、ロック部材16の規制面16cがボタン部材14の頭部14bの内端面14cに当接することによりボタン部材14が規制され、誤操作などにより意図せずにボタン部材14が押圧されることを防止するようになっている。

【0007】

【発明が解決しようとする課題】しかしながら、上記従来の操作ボタンにおいては、ボタン部材14の頭部14bとロック部材16との間に弾性部材17が圧縮状態にて収容されているので、ロック部材16を突出させてボタン部材14をロックした状態においては、弾性部材17が強い圧縮状態となり、弾性部材17の塑性変形などによって弾性部材17の弾性特性が経時変化を生じ、ボタン部材14の復帰力が低下して、操作性が悪化するなどの問題点がある。

【0008】また、従来の操作ボタンにおいては、パイプ部材12とロック部材16との螺合径がボタン部材14の頭部14bとロック部材16との当接部位の径より

も小さいことからネジが細くなるために、ロック部材16の取付強度を高めるには軸線方向の螺合長さを或る程度長くする必要があり、その結果、ボタン構造の全長が長い割に径が小さい構造となるので、ロック部材の円滑な回転を確保することが困難になって操作性が低下し、その上、胴11からのボタン部材14の突出量が大きくなり外観が悪化するとともにパイプ部材12やボタン部材14などが横荷重に弱く、曲り易いという問題点がある。

【0009】さらに、胴11とパイプ部材12とのロウ付け接合部において、片凹溝11cが拡張穴部11b内に向けて開いているので、片凹溝11cからパイプ部材12の外端部12aの外周面上へとロウが流れ出し易く、ロウ付け状態が不安定になり、ロウ付け部位の強度や防水性などが不十分になる場合があるという問題点もある。

【0010】そして、上記ロック部材16の規制面16cは、その内側に弾性部材17を当接させた内端部16dに至るまでほぼ平坦に形成され、ボタン部材14の頭部14bに形成された内端面14c全体に接触するように構成されているので、ボタン部材14とロック部材16との当接面積が大きくなることから、ロック状態においてロック部材16をねじ込んでロック状態を解除する際に必要な操作トルクが大きくなり、操作が重くなるという問題点がある。

【0011】そこで本発明は上記問題点を解決するものであり、その課題は、操作性を全体として向上することができるボタン構造を提供することにある。より具体的には、弾性部材の弾性力の経時変化を低減できるボタン構造の提供、全長及び基体からの突出量を低減することができるロック機能付きのボタン構造の提供、基体に取り付けられる上記パイプ部材等の固定部材を確実に固定することのできるボタン構造の提供、ロック状態の解除操作を小さな操作トルクで行うことのできるボタン構造の提供などを目的とする。

【0012】

【課題を解決するための手段】上記課題を解決するために本発明のボタン構造は、基体に対して出沒可能に取り付けられた軸部、及び、該軸部の外端にて拡張した頭部を備えたボタン部材と、前記基体若しくは前記基体に固定された固定部材に螺合し、その螺合深さに応じて前記基体に対して出沒動作するように構成され、既定の螺合状態において前記頭部に当接して前記ボタン部材の出沒動作を規制するロック部材と、前記ボタン部材の頭部と前記基体との間、又は前記ボタン部材の頭部と前記固定部材との間に収容された弾性部材と、を有することを特徴とする。

【0013】本発明によれば、弾性部材がボタン部材の頭部と基体との間、又は前記ボタン部材の頭部と固定部材との間に収容されていることにより、ロック部材が移

動しても弾性部材の圧縮状態が変化しないので、弾性部材の弾性特性の変化を防止し、ボタン構造の耐久性を高めることができる。また、ロック部材の位置によってボタン操作に必要な押圧力が変化しないので、操作性を向上させることができる。

【0014】また、本発明の別のボタン構造は、基体に対して出沒自在に取り付けられた軸部、及び、該軸部の外端にて拡径した頭部を備えたボタン部材と、前記基体若しくはこれに固定された固定部材に螺合し、その螺合深さに応じて前記基体に対して出沒動作するように構成され、既定の螺合状態において前記頭部に当接して前記ボタン部材の出沒動作を規制するロック部材と、を有し、前記ボタン部材の前記頭部の内端面の一部に対してのみ前記ロック部材の規制面が当接するように構成されていることを特徴とする。

【0015】本発明によれば、ボタン部材の頭部の内端面の一部に対してのみロック部材の規制面が当接するように構成されていることにより、当接面積が低減されるので、ロック部材を回転操作してロック状態（当接状態）を解除する際の操作トルクを低減し、操作感を軽くして、操作性を向上させることができる。

【0016】上記各発明において、前記ボタン部材の前記頭部と前記ロック部材との当接部位の径位置と、前記ロック部材と前記基体との螺合部位、又は前記ロック部材と前記固定部材との螺合部位の径位置とがほぼ等しいことが好ましい。

【0017】さらに、本発明のさらに別のボタン構造は、基体に対して出沒自在に取り付けられた軸部、及び、該軸部の外端にて拡径した頭部を備えたボタン部材と、前記基体若しくは前記基体に固定された固定部材に螺合し、その螺合深さに応じて前記基体に対して出沒動作するように構成され、既定の螺合状態において前記頭部に当接して前記ボタン部材の出沒動作を規制するロック部材と、を有し、前記ボタン部材の前記頭部と前記ロック部材との当接部位の径位置と、前記ロック部材と前記基体若しくは前記固定部材との螺合部位の径位置とがほぼ等しいことを特徴とする。

【0018】本発明によれば、ボタン部材の頭部とロック部材との間の当接部位の径位置（径方向の位置）と、ロック部材と基体若しくは固定部材との間の螺合部位の径位置とがほぼ等しいことにより、従来よりもロック部材の螺合部位の径を大きくすることができるので、ロック部材の取付強度を高めることができるとともに、ネジ径が大きくなったことによりロック部材の回転操作を円滑に行うことができるように構成し易くなり、操作性が向上する。さらに、螺合部位の径が大きくなった分、螺合部位の軸線方向の長さを短縮することができるので、基体からのボタン構造の突出量を低減できる。

【0019】また、前記ロック部材の内端に凹溝若しくは内周側に開いた片凹溝が設けられ、該凹溝若しくは片

凹溝の内面と前記基体若しくは前記固定部材とが当接することにより、前記ロック部材のそれ以上の没入動作が規制されるように構成されていることを特徴とする。これによって、基体の外面位置と、ロック部材の凹溝若しくは片凹溝の内面に当接する基体若しくは固定部材の当接部位との距離よりもロック部材の出沒動作のストロークを大きくしても、ロック部材の内端部の外周部分が基体の外面より外側に突出することがないように構成することができるので、基体若しくは固定部材をロック部材の凹溝若しくは片凹溝及びその外周側部分に対応させるために、ロック部材の内端に対向する部分の外周側に溝若しくは段差を形成するだけで、ボタン構造の突出量を増大させることなく、ロック部材の動作ストロークを増大させ、或いは、ロック部材の内端が基体の外面から外側へ出ることを防止することができる。また、ロック部材の内端と基体若しくは固定部材との当接面積が低減されるので、通常状態からロック部材を引き出す際の操作トルクを低減することができ、操作性を向上させることができる。

【0020】上記各発明において、前記ロック部材には、前記ボタン部材の前記頭部に対する規制部位よりもさらに外側に突出し、前記ロック部材の突出状態において前記頭部を包囲する外側包囲部を有することが好ましい。この外側包囲部によりボタン部材の頭部を保護することができる。

【0021】上記各発明において、前記基体には前記固定部材が固定され、前記ボタン部材は前記固定部材に挿通された状態で軸線方向に摺動可能に取り付けられているとともに、前記ロック部材が前記固定部材に螺合するように構成されていることが基体加工の困難性を回避する上で好ましい。

【0022】また、前記固定部材は前記基体に挿通される小径筒部と、該小径筒部の外側にて外周側に張り出し、その内側面が前記基体に当接したフランジ部と、該フランジ部よりも外側に設けられた前記ロック部材に螺合可能なネジ形成部とを有することを特徴とする。フランジ部を設けることによって固定部材の取付強度を高めることができる。

【0023】さらに、前記ロック部材の内端に内周側に開いた片凹溝が設けられ、該片凹溝の内面と前記フランジ部とが当接することにより、前記ロック部材のそれ以上の没入動作が規制されるように構成されていることを特徴とする。

【0024】また、前記フランジ部と前記ネジ形成部との間に環状溝が形成されていることを特徴とする。この手段によれば、ネジ形成部を設けるためのネジ加工をフランジ部に妨げられることなく容易に行うことができる。

【0025】次に、本発明の携帯機器は上記いずれかに記載のボタン構造を有する。このようなボタン構造を有

する携帯機器としては、腕時計、懐中時計、多機能時計などの携帯時計、ストップウォッチ、ダイバーズコンピュータ、携帯電話、ページャー、携帯型情報端末などが挙げられる。

【0026】

【発明の実施の形態】次に、添付図面を参照して本発明に係るボタン構造及びこれを備えた携帯機器の実施形態について詳細に説明する。図2は、本実施形態の携帯機器である携帯時計（腕時計）20の全体構成を模式的に示す概略断面図である。携帯時計20は、胴（時計ケース）21と、これに取り付けられた裏蓋29とからなるケース体の内部にムーブメント20Mと表示部21Dとが内蔵され、この表示部21Dを透視可能に覆う表示窓21Tが取り付けられている。

【0027】胴21の側部には貫通孔21aが形成され、この貫通孔21aの外側部分は拡張穴部21bとなっている。この貫通孔21aには、上記固定部材に相当するパイプ部材22と、ボタン部材24と、ロック部材26とが直接若しくは間接的に取り付けられている。

【0028】図1は、上記携帯時計20に設けられた本実施形態のボタン構造をより詳細に示す断面図である。ここで、図1(a)はボタン操作可能な通常状態を示す拡大断面図であり、図1(b)はロック部材26によってボタン操作が規制されたロック状態を示す拡大断面図である。

【0029】パイプ部材22は全体として段付き円筒状に形成され、貫通孔21aの小径部（最も内側（図示左側）に形成されている部分）に挿通された内側部22aと、この内側部22aの外側（図示右側）に設けられ、外周側にフランジ状（円板状）に張り出したフランジ部22bと、このフランジ部22bのさらに外側に設けられ、拡張穴部21b内に突出した外側部22cとを備えている。また、フランジ部22bと外側部22cとの間の外周面には環状溝22dが形成されている。外側部22cの外周面には雄ネジが形成されている。

【0030】パイプ部材22は、胴21の拡張穴部21bの段差部に設けられた環状の片凹溝21c内にリング状のロウ材23を入れた後に、貫通孔21aにその内側部21aを嵌入し、内側部21aの外周面とフランジ部21bの内側面とによって片凹溝21cが完全に閉鎖された状態となるようにし、この状態で加熱してロウ材23を溶融させることにより、胴21に対して接合されている。このとき、フランジ部22bによって片凹溝21cが完全に閉鎖されるので、ロウ材23が漏出することによる接合状態の不安定性や接合強度の不足を回避することができる。

【0031】なお、上記環状溝22dは、フランジ部22bの内周部分と外側部22cとの間に所定の間隔を設けることにより、外側部22cの外周面に雄ネジを形成するためのネジ加工がフランジ部22bによって妨げら

れないようにするために設けられたものである。

【0032】ボタン部材24は、バッキン24dを装着された円柱状の軸部24aと、この軸部24aの外端にて拡張した頭部24bとを備えている。軸部24aは上記パイプ部材22内にて軸線方向へ摺動可能に挿通され、胴21内に突出した部分に止め輪25が装着され、この止め輪25がパイプ部材22の内端に係合することにより、ボタン部材24が外側へ抜け出ないようにしている。頭部24bは、ほぼ環状の平坦面からなる内端面24cを有し、この内端面24cの内側に内側溝部24eが形成されている。ここで、上記パイプ部材22の外端面22eと内側溝部24eとは相互に対向配置されており、当該外端面22eと内側溝部24eとの間にコイルバネ等からなる弾性部材27が圧縮状態で収容されている。

【0033】上記弾性部材27としては、その弾性力によってボタン部材24に復帰力を与えるように構成されているものであればよい。本実施形態では弾性部材をコイルバネで構成しているが、サラバネなどの任意のバネであってもよく、ウレタンゴムなどのゴムであってもよい。

【0034】ロック部材26は全体として段付き円筒状に形成され、内側部26aと、この内側部26aよりも内外径が増大した外側部26bとを備えている。内側部26aの内周面には雌ネジが形成され、上記パイプ部材22の外側部22cの外周面に形成された雄ネジと螺合している。外側部26bは、ボタン部材24の頭部24bの外径よりもやや大きな内径を有し、後述するように外側へ引き出された状態ではボタン部材24の頭部24bを周囲から取り囲み、ボタン部材24の頭部24bを保護するように構成されている。内側部26aと外側部26bとの間の段差部には、軸線方向外側を向いたほぼ平坦なリング状の規制面26cが形成されている。この規制面26cは、上記ボタン部材24の頭部24bの内端面24cと対向している。

【0035】ここで、ロック部材26の内側部26aと、パイプ部材22の外側部22cとは、上記ボタン部材24の頭部24bの内端面24cとほぼ等しい螺合径を備えている。そして、ロック部材26の規制面26cはこの螺合径よりも外周側において平坦に形成されているので、規制面26cは、頭部24bの内端面24cのうち径方向外側の部分にのみ当接するように構成されている。

【0036】また、ロック部材26の内端部26eの内周側部分には内周側に開いた片凹溝26dが形成されている。そして、図1(a)に示すように、この片凹溝26dの内面に対してパイプ部材22のフランジ部22cが当接するように構成されている。このとき、上記片凹溝26dの内面とフランジ部22cとの当接により、ロック部材26のそれ以上の没入動作が禁止されるので、

その内端部26eが胴21の拡張部21bの内面には当接しないようになっている。

【0037】ロック部材26の外側部26bの外周面にはローレット26fが形成され、手指などによって簡単に回転操作できるように構成されている。図1(a)に示す通常状態では、ロック部材26はパイプ部材22の外側部22cに対して深くねじ込まれた状態となっており、その結果、ロック部材26の規制面26cがボタン部材24の頭部24bの内端面24cから離れているので、ボタン部材24の頭部24bを押圧することによって弾性部材27が圧縮されながら軸部24bの内端が胴21の内側に突出し、胴21の内部に設置された接点バネ28などを移動させるように構成されている。

【0038】ロック部材26を回転させてそのパイプ部材22に対する螺合深さを低減させると、ロック部材26は全体的に軸線方向外側へ移動し、その規制面26cがボタン部材24の頭部24bの内端面24cに近づくので、ボタン部材24の押圧操作が規制される。特に、図1(b)に示すように、ロック部材26の規制面26cが頭部24の内端面24cに当接するまでロック部材26を引き出すことによって、ボタン部材24を押圧操作することが全くできないロック状態になる。

【0039】以上説明した本実施形態においては、ボタン部材24の復帰力(ボタン部材24が押圧されたときに元の位置に戻すための力)を発揮する弾性部材27が、パイプ部材22の外側部22cの外端面22eと、ボタン部材24の頭部24bの内側溝部24eとの間に收容されている。したがって、図1(a)に示す通常状態と、図1(b)に示すロック状態のいずれにおいても弾性部材27の圧縮状態に変わりはなく、ボタン操作をしない限りロック部材26をどの位置に移動させても弾性部材27がより圧縮された状態になることはない。したがって、弾性部材27は常に一定の状態でのボタン操作のみによって圧縮されることとなるので、弾性部材27の弾性特性を長期間一定に保持することが可能になり、ボタン構造の耐久性を高めることができるとともに、弾性部材27に対する応力負担が低減されるので、操作性を長期に亘って良好に保つことができる。また、ロック部材26の位置が変わってもボタン操作時の押圧力が変化しないので、操作性自体を向上させることができる。

【0040】また、本実施形態においては、図3に示す従来構造のように弾性部材17を内端部16dにガイドさせる必要がなくなり、弾性部材27をボタン部材24の軸部24aに挿通させるだけで組み立てることができるので、組立作業がしやすくなる。

【0041】また、本実施形態においては、パイプ部材22とロック部材26との螺合部位の径位置がボタン部材24の頭部24bの外周側に設けられた内端面24cとほぼ等しい径位置にあるので、従来よりも(ボタン部材24の頭部24bの外径を基準として従来構造と比較

すると)パイプ部材22とロック部材26との螺合径を大きくすることができる。この結果、パイプ部材22の外側部22bの雄ネジ及びロック部材26の内側部26aの雌ネジの軸線方向の長さを短くしても十分な螺合長さ(ネジ山同士の噛合している螺旋に沿った長さ)を十分に確保することができるので、螺合部位の剛性及びボタン部材24の動作ストロークを確保しつつ、ボタン構造の軸線方向の全長を短縮することができる。また、螺合径の増大及び全長の短縮によってボタン構造の強度を大幅に向上させることができる。さらに、螺合径の増大によってロック部材26の回転をよりスムーズにすることが容易になるので、ロック部材に対する操作性を向上させることができる。

【0042】さらに、本実施形態ではロック部材26の規制面26cがボタン部材24の頭部24bの内端面24cの一部、すなわち外周側の部分、にのみ当接するように構成されているので、図1(b)に示す完全なロック状態を解除するためにロック部材26を図示状態からねじ込む際の操作トルクを低減することができる。すなわち、ロック部材26のロック状態の解除時の操作感を軽くすることができる。ここで、上記のようにパイプ部材22とロック部材26の螺合部位の径がボタン部材24の内端面24cの径位置とほぼ等しく形成されているので、上記のように規制面26cと内端面24cとの当接範囲を限定するためにロック部材26の雌ネジの軸線方向外端と規制面26cとの間に段差を設ける必要がなくなるから、ボタン構造の全長をさらに短くできる。すなわち、従来技術の図3に示すLの寸法を短くできる。

【0043】また、本実施形態では片凹溝21cがパイプ部材22の内側部22aとフランジ部22bとによって完全に閉鎖された状態でロウ付けが行われているので、ロウ付け時のロウ材の漏出を防止することができ、接合状態を安定させることができるとともに、接合強度や防水性を向上させることができる。

【0044】さらに、本実施形態においては、ボタン部材24やロック部材26を簡単に取り外すことができるので、メンテナンス時などの作業が容易になる。

【0045】上記実施形態において、ロック部材26の内端部26eの内周側には片凹溝26dが設けられているので、上記パイプ部材22のフランジ部22bが存在してもこれを回避してボタン構造の軸線方向の全長を増大させることなくボタン部材24の動作ストロークを確保することができる。また、ロック部材26は上記片凹溝26dの内面がフランジ部22bに当接するように構成され、胴21の拡張部21b内の内面には接触しないように構成されているので、ロック部材26を径方向に厚く形成しても、胴21との当接面積が大きくなることによるロック部材26のロック操作開始時の操作トルクの増加を回避することができる。更にこの場合、片凹溝26dはロック部材26の内端部26eの内周側に形

成されているので、図1(b)に示すロック状態において、ロック部材26の内端部26eが拡張穴部21bから出にくくなるため、外観デザインを良好に保つことができる。

【0046】尚、本発明のボタン構造及びこれを備えた携帯機器は、上述の図示例にのみ限定されるものではなく、本発明の要旨を逸脱しない範囲内において種々変更を加え得ることは勿論である。例えば、上記実施形態では、基体に相当する胴21に対して固定部材に相当するパイプ部材22を接合した状態で構成しているが、固定部材を別途設けることなく、上記実施形態における胴21とパイプ部材22とを一体の基体として構成しても構わない。

【0047】また、本発明の携帯機器は、上記の携帯時計に限らず、多機能時計、ストップウォッチ、ダイビングコンピュータ、携帯電話、ページャー、携帯型情報端末などの種々の携帯機器に用いることができるものである。

【0048】

【発明の効果】以上、説明したように本発明によれば、ロック機能を有するボタン構造の操作性を向上させることができる。

【図面の簡単な説明】

【図1】本発明に係るボタン構造の実施形態における通常状態を示す拡大断面図(a)及びロック状態を示す拡大断面図(b)である。

【図2】同実施形態の携帯時計の全体構成を模式的に示す概略断面図である。

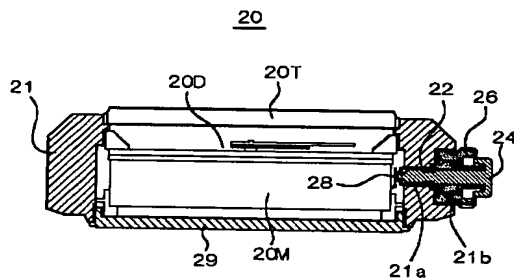
【図3】従来のボタン構造を示す拡大断面図である。

【符号の説明】

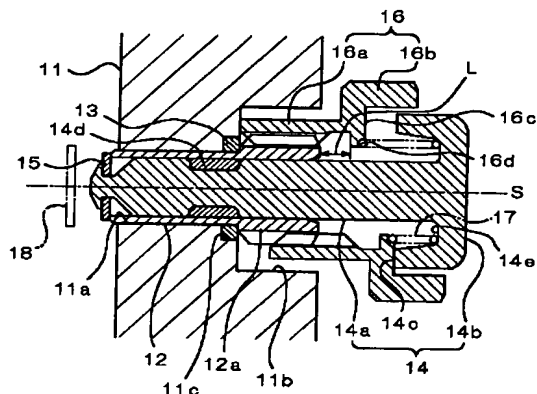
\*30

- \*20 携帯時計
- 21 胴
- 21a 貫通孔
- 21b 拡張穴部
- 21c 片凹溝
- 22 パイプ部材
- 22a 内側部
- 22b フランジ部
- 22c 外側部
- 22d 凹溝部
- 22e 外端面
- 23 ロウ材
- 24 ボタン部材
- 24a 軸部
- 24b 頭部
- 24c 内端面
- 24d バッキン
- 24e 凹溝
- 25 止め輪
- 26 ロック部材
- 26a 内側部
- 26b 外側部
- 26c 規制面
- 26d 片凹溝
- 26e 内端部
- 26f ローレット
- 27 弾性部材
- 28 接点バネ
- 29 裏蓋

【図2】

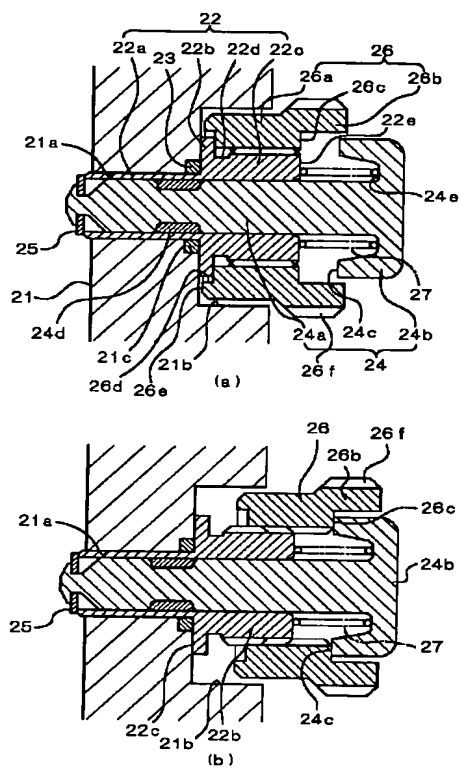


【図3】





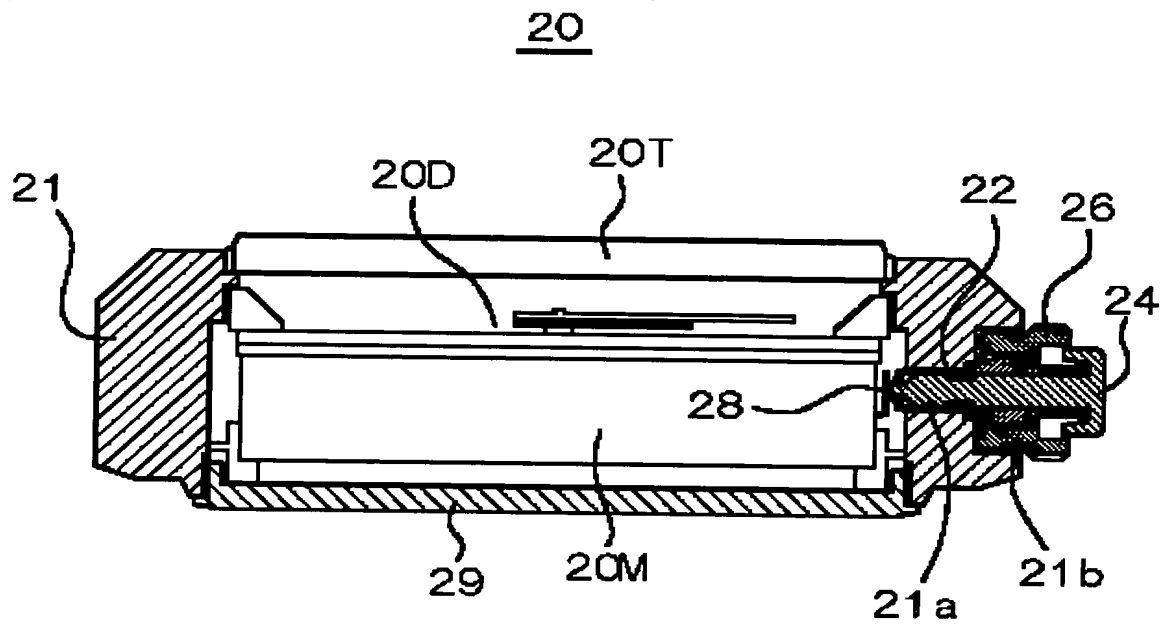
【図1】

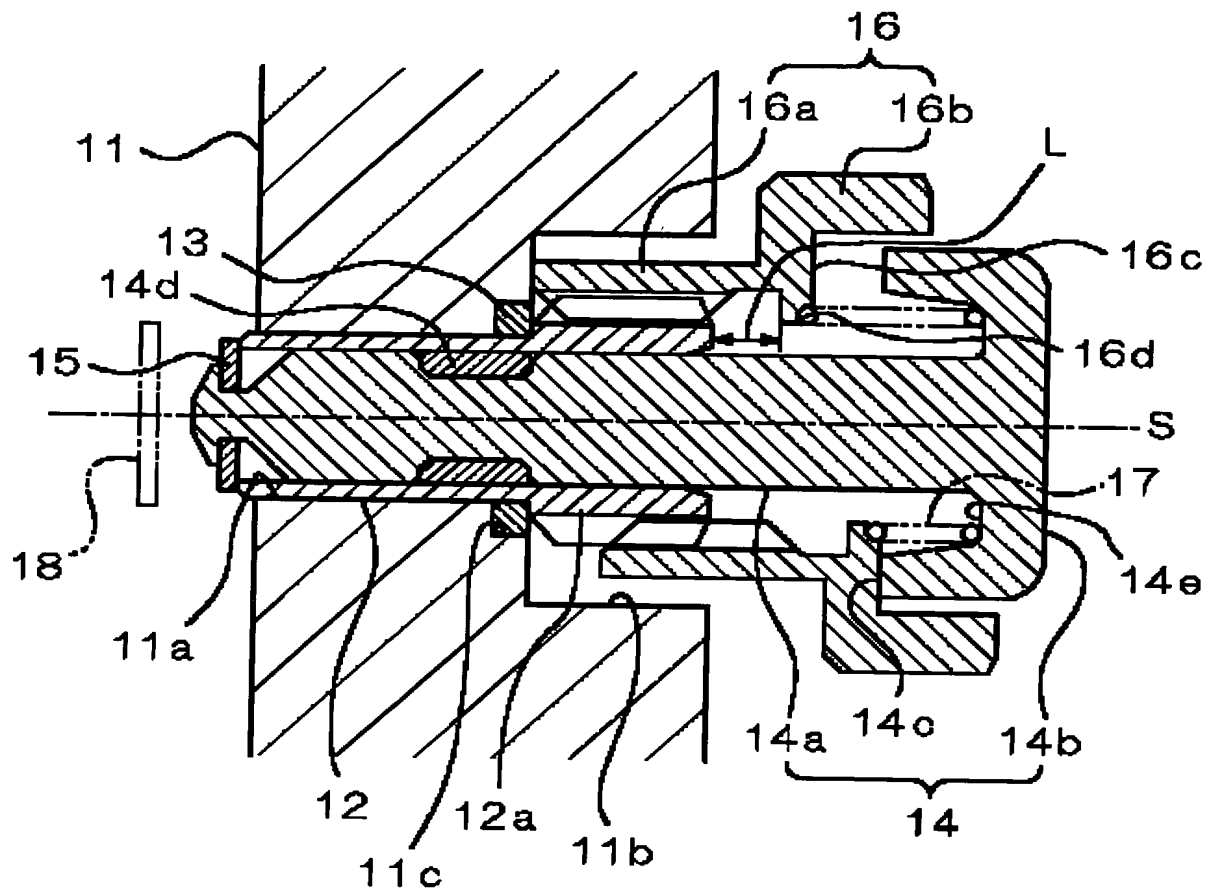



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フロントページの続き

Fターム(参考) 2F002 AA05 AB02 AC01 BA04 BA28  
 5G006 BA01 BB01 BC02 CB03 CB06  
 CD02 HB09 NB01





# PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2003-007164

(43)Date of publication of application : 10.01.2003

(51)Int.Cl.

H01H 13/14

G04G 1/00

H01H 3/20

(21)Application number : 2001-185122

(71)Applicant : SEIKO EPSON CORP

(22)Date of filing : 19.06.2001

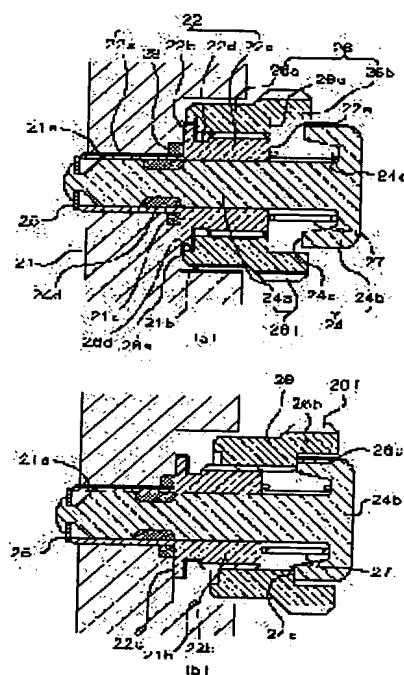
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ARAI HIROYUKI

## (54) BUTTON STRUCTURE AND PORTABLE EQUIPMENT PROVIDED WITH IT

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To improve the operativity of button structure provided with a lock function.

**SOLUTION:** A pipe member 22 is fixed to a through hole 21a of a barrel 21, and an inside part 26a of a lock member 26 is threaded into an outside part 22c of the pipe member 22. A button member 24 is slidably inserted in the pipe member 22, and an elastic member 27 is housed between its head part 24b and the pipe member 22. The lock member 26 is provided with a regulation surface 26c which abuts an inside end surface 24c of the head part 24b of the button member 24 to lock button operation.



## LEGAL STATUS

[Date of request for examination]

11.03.2002

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

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2.\*\*\*\* shows the word which can not be translated.

3.In the drawings, any words are not translated.

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CLAIMS

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[Claim(s)]

[Claim 1] The carbon button member equipped with the shank attached possible [ frequent appearance ] to the base, and the head whose diameter was expanded in the outer edge of this shank, Screw in the holddown member fixed to said base or said base, and it is constituted so that frequent appearance actuation may be carried out to said base according to the screwing depth. Carbon button structure characterized by having the elastic member held between the lock member which regulates frequent appearance actuation of said carbon button member in contact with said head in a fixed screwing condition, and the head of said carbon button member and said base material, or between the head of said carbon button member, and said holddown member.

[Claim 2] The carbon button member equipped with the shank attached free [ frequent appearance ] to the base, and the head whose diameter was expanded in the outer edge of this shank, The lock member which screws in the holddown member fixed to said base or this, is constituted so that frequent appearance actuation may be carried out to said base according to the screwing depth, and regulates frequent appearance actuation of said carbon button member in contact with said head in a fixed screwing condition, Carbon button structure characterized by being constituted so that it may \*\*\*\* and the regulation side of said lock member may contact only to a part of inner end face of said head of said carbon button member.

[Claim 3] Carbon button structure according to claim 1 or 2 where the path location of the contact part of said head of said carbon button member and said lock member and the path location of the screwing part of said lock member and said base or the screwing part of said lock member and said holddown member are characterized by the almost equal thing.

[Claim 4] The carbon button member equipped with the shank attached free [ frequent appearance ] to the base, and the head whose diameter was expanded in the outer edge of this shank, Screw in the holddown member fixed to said base or said base, and it is constituted so that frequent appearance actuation may be carried out to said base according to the screwing depth. The lock member which regulates frequent appearance actuation of said carbon button member in contact with said head in a fixed screwing condition, Carbon button structure which \*\*\*\* and is characterized by the path location of the contact part of said head of said carbon button member and said lock member and the path location of said lock member and said base, or a screwing part with said holddown member being almost equal.

[Claim 5] Carbon button structure given in any 1 term of claim 1 characterized by being constituted so that the devotion actuation beyond it of said lock member may be regulated, when the piece concave opened to the concave or inner circumference side is prepared in the inner edge of said lock member and the inside, said base, or said holddown member of this concave or a piece concave contacts thru/or claim 4.

[Claim 6] Carbon button structure given in any 1 term of claim 1 characterized by having the outside envelopment section which surrounds [ rather than the specification part to said head of said carbon button member ] said head in a projection and the protrusion condition of said lock member outside further in said lock member thru/or claim 5.

[Claim 7] It is carbon button structure given in any 1 term of claim 1 which said holddown

member is fixed to said base, and is characterized by constituting said carbon button member so that said lock member may screw in said holddown member, while being attached possible [ sliding of the direction of an axis ] in the condition of having been inserted in said holddown member thru/or claim 6.

[Claim 8] Said holddown member is carbon button structure according to claim 7 characterized by having the minor diameter cylinder part inserted in said base, the flange to which it \*\*\*\*\* to the periphery side on the outside of this minor diameter cylinder part, and the medial surface contacted said base, and the screw formation section which can be screwed in said lock member prepared outside this flange.

[Claim 9] Said holddown member is carbon button structure according to claim 8 characterized by having fixed after the both sides of the peripheral face of said minor diameter cylinder part and the medial surface of said flange have contacted to said base.

[Claim 10] Carbon button structure according to claim 8 or 9 characterized by being constituted so that the deviation actuation beyond it of said lock member may be regulated, when the piece concave opened to the inner circumference side is prepared in the inner edge of said lock member and the inside and said flange of this piece concave contact.

[Claim 11] Carbon button structure given in any 1 term of claim 8 characterized by forming the circular sulcus between said flange and said screw formation section thru/or claim 10.

[Claim 12] The pocket device which has the carbon button structure of a publication in any 1 term of claim 1 thru/or claim 11.

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[Translation done.]

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the pocket device equipped with carbon button structure and this, and when especially prepared in the pocket device of watch and others, it relates to suitable carbon button structure.

[0002]

[Description of the Prior Art] Generally, in various pocket devices, such as watch, such as a wrist watch and a pocket watch, stop watch, and a diving computer, a manual operation button may be prepared in the external surface of a body. In the manual operation button, a carbon button member is attached possible [ frequent appearance ] to a body so that it may usually project slightly from the external surface of a body, and by pressing this carbon button member, it is constituted so that the contact within a body etc. may operate. In order to prevent an operation mistake, the lock device which regulates press actuation of a carbon button member may be prepared in a manual operation button.

[0003] Drawing 3 is the expanded sectional view expanding and showing the flank of the drum which constitutes the body of a clock in the conventional watch (wrist watch). In addition, the illustration upper part of Axis S and an illustration lower part have shown the condition of differing mutually. Through tube 11a is formed in the flank of a drum 11, and diameter expansion hole 11b whose diameter was expanded is prepared in the outside of this through tube 11a. The cylinder-like pipe member 12 is inserted in through tube 11a, and by putting in and heating the low ring-like material 13 in piece concave 11c, it is joined so that a drum 11 and the pipe member 12 may be in a fixing condition.

[0004] Shank 14a of the carbon button member 14 is inserted in in the condition of having equipped with packing 14d, and is attached in the direction of an axis possible [ sliding ] at the pipe member 12. Head 14b whose diameter was expanded in the outer edge of shank 14a is prepared in the carbon button member 14. The inner edge of shank 14a of the carbon button member 14 is equipped with the snap ring 15, and this snap ring 15 engages with the inner edge of the above-mentioned pipe member 12 in the condition of having projected inside the drum 11, and he is trying for the carbon button member 14 to escape from it and not to come out of it outside from a drum 11.

[0005] Shank 14a of the carbon button member 14 has inserted in the cylinder-like lock member 16 with a stage with allowances. the lock member 16 -- inside section 16a -- among these, it had the configuration with a stage of having lateral part 16b with a bigger path than flank 16a, and has regulation side 16c which was outside suitable between inside section 16a and lateral part 16b. Moreover, a female screw is formed in the inner skin of inside section 16a, and it is screwing in it to the male screw formed in the peripheral face of heel 12a projected in diameter expansion hole 11b from a part for the narrow diameter portion of through tube 11a in the above-mentioned pipe member 12. Furthermore, between 16d of toes of inside slot 14e of head 14b of the carbon button member 14, and regulation side 16c of the lock member 16, the elastic member 17 which consists of a coil spring is held in the state of compression.

[0006] If head 14b of the carbon button member 14 is pressed from the illustration axis S where



the lock member 16 is thrust deeply, as shown in the illustration upper part, pushing and drawing in one's elastic member 17, the manual operation button with this lock device slides in the direction of an axis so that the carbon button member 14 may sink into a drum 11, and it is constituted so that the contact spring 18 arranged inside a drum 11 may be operated. Moreover, if the lock member 16 is pulled out from the illustration axis S as shown in an illustration lower part, when regulation side 16c of the lock member 16 contacts inner end-face 14c of head 14b of the carbon button member 14, the carbon button member 14 will be regulated and it will prevent that the carbon button member 14 is pressed without meaning by an operation mistake etc.

[0007]

[Problem(s) to be Solved by the Invention] However, it sets to the above-mentioned conventional manual operation button. Since the elastic member 17 is held in the state of compression between head 14b of the carbon button member 14, and the lock member 16 In the condition of having made the lock member 16 projecting and having locked the carbon button member 14 An elastic member 17 will be in a strong compression condition, the elasticity of an elastic member 17 produces aging by the plastic deformation of an elastic member 17 etc., the return force of the carbon button member 14 declines, and there is a trouble of operability getting worse.

[0008] Moreover, since the diameter of screwing of the pipe member 12 and the lock member 16 is smaller than the path of the contact part of head 14b of the carbon button member 14, and the lock member 16 and a screw becomes thin in the conventional manual operation button the attachment reinforcement of the lock member 16 -- raising -- the screwing die length of the direction of an axis -- a certain extent, since it is necessary to lengthen, consequently a path serves as small structure comparatively [ with the long overall length of carbon button structure ] It becomes difficult to secure smooth rotation of a lock member, operability falls, and, moreover, there is a trouble of the pipe member 12, the carbon button member 14, etc. being weak to a lateral load while the amount of protrusions of the carbon button member 14 from a drum 11 becomes large and an appearance gets worse, and being easy to bend.

[0009] Furthermore, in the low attachment joint of a drum 11 and the pipe member 12, since piece concave 11c is open towards the inside of diameter expansion hole 11b, there is also a trouble that a low may tend to flow out of piece concave 11c into up to the peripheral face of heel 12a of the pipe member 12, a low attachment condition may become unstable, and the reinforcement of a low attachment part, waterproofness, etc. may become inadequate.

[0010] And regulation side 16c of the above-mentioned lock member 16 Since it is constituted so that the whole inner end-face 14c which was formed almost evenly and formed in head 14b of the carbon button member 14 may be contacted until it reaches 16d of toes which made the elastic member 17 contact the inside Since the contact area of the carbon button member 14 and the lock member 16 becomes large, there is a trouble that required actuation torque becomes large in case the lock member 16 is thrust in a lock condition and a lock condition is canceled, and actuation becomes heavy.

[0011] Then, this invention solves the above-mentioned trouble and the technical problem is in offering the carbon button structure which can improve operability as a whole. It aims at offer of the carbon button structure which can certainly fix holddown members, such as the above-mentioned pipe member attached in offer of the carbon button structure with a lock function where offer of the carbon button structure where aging of the elastic force of an elastic member can be reduced, an overall length, and the amount of protrusions from a base can more specifically be reduced, and a base, offer of the carbon button structure where discharge actuation of a lock condition can be performed with small actuation torque, etc.

[0012]

[Means for Solving the Problem] In order to solve the above-mentioned technical problem the carbon button structure of this invention The carbon button member equipped with the shank attached possible [ frequent appearance ] to the base, and the head whose diameter was expanded in the outer edge of this shank, Screw in the holddown member fixed to said base or said base, and it is constituted so that frequent appearance actuation may be carried out to said

base according to the screwing depth. It is characterized by having the elastic member held between the lock member which regulates frequent appearance actuation of said carbon button member in contact with said head in a fixed screwing condition, and the head of said carbon button member and said base material, or between the head of said carbon button member, and said holddown member.

[0013] Since according to this invention the compression condition of an elastic member does not change even if a lock member moves by holding the elastic member between the head of a carbon button member, and a base material, or between the head of said carbon button member, and the holddown member, change of the elasticity of an elastic member can be prevented and the endurance of carbon button structure can be raised. Moreover, since thrust required for button grabbing does not change with the locations of a lock member, operability can be raised.

[0014] Moreover, the carbon button member equipped with the shank in which another carbon button structure of this invention was attached free [ frequent appearance ] to the base, and the head whose diameter was expanded in the outer edge of this shank, The lock member which screws in the holddown member fixed to said base or this, is constituted so that frequent appearance actuation may be carried out to said base according to the screwing depth, and regulates frequent appearance actuation of said carbon button member in contact with said head in a fixed screwing condition, It \*\*\*\* and is characterized by being constituted so that the regulation side of said lock member may contact only to a part of inner end face of said head of said carbon button member.

[0015] Since contact area is reduced by being constituted so that the regulation side of a lock member may contact only to a part of inner end face of the head of a carbon button member according to this invention, the actuation torque at the time of carrying out rotation actuation of the lock member, and canceling a lock condition (contact condition) can be reduced, a feeling of actuation can be made light, and operability can be raised.

[0016] In each above-mentioned invention, it is desirable that the path location of the contact part of said head of said carbon button member and said lock member and the path location of the screwing part of said lock member and said base or the screwing part of said lock member and said holddown member are almost equal.

[0017] Furthermore, the carbon button member equipped with the shank in which still more nearly another carbon button structure of this invention was attached free [ frequent appearance ] to the base, and the head whose diameter was expanded in the outer edge of this shank, Screw in the holddown member fixed to said base or said base, and it is constituted so that frequent appearance actuation may be carried out to said base according to the screwing depth. The lock member which regulates frequent appearance actuation of said carbon button member in contact with said head in a fixed screwing condition, It \*\*\*\* and the path location of the contact part of said head of said carbon button member and said lock member and the path location of said lock member and said base, or a screwing part with said holddown member are characterized by the almost equal thing.

[0018] According to this invention, the path location (location of the direction of a path) of the contact part between the head of a carbon button member and a lock member and the path location of a lock member, a base, or the screwing part between holddown members according to an almost equal thing Since the path of the screwing part of a lock member can be enlarged conventionally, while being able to raise the attachment reinforcement of a lock member, when the diameter of a screw became large, it is easy to constitute, and becomes so that rotation actuation of a lock member can be performed smoothly, and operability improves. Furthermore, since the path of a screwing part can shorten the axis lay length of a part and a screwing part which became large, the amount of protrusions of the carbon button structure from a base can be reduced.

[0019] Moreover, when the piece concave opened to the concave or inner circumference side is prepared in the inner edge of said lock member and the inside, said base, or said holddown member of this concave or a piece concave contacts, it is characterized by being constituted so that the devotion actuation beyond it of said lock member may be regulated. Even if it makes the stroke of frequent appearance actuation of a lock member larger than the distance of the

outside location of a base, and the contact part of the base or holddown member which contacts the inside of the concave of a lock member, or a piece concave by this. Since it can constitute so that the periphery part of the toe of a lock member may not project outside the external surface of a base. In order to make a base or a holddown member correspond to a part for the concave of a lock member or a piece concave, and its periphery flank. Only by forming a slot or a level difference in the periphery side of the part which counters the inner edge of a lock member, it can prevent that increase the stroke of a lock member of operation, or the inner edge of a lock member comes out outside from the external surface of a base, without increasing the amount of protrusions of carbon button structure. Moreover, since the inner edge of a lock member, a base, or contact area with a holddown member is reduced, the actuation torque at the time of pulling out a lock member from a normal state can be reduced, and operability can be raised.

[0020] In each above-mentioned invention, it is desirable to have the outside envelopment section which surrounds [ rather than the specification part to said head of said carbon button member ] said head in a projection and the protrusion condition of said lock member outside further in said lock member. The head of a carbon button member can be protected by this outside envelopment section.

[0021] In each above-mentioned invention, said holddown member is fixed to said base, and when being constituted so that said lock member may screw in said holddown member avoids the difficulty of base processing, said carbon button member is desirable, while it is attached possible [ sliding of the direction of an axis ] in the condition of having been inserted in said holddown member.

[0022] Moreover, said holddown member is characterized by having the minor diameter cylinder part inserted in said base, the flange to which it \*\*\*\*\*ed to the periphery side on the outside of this minor diameter cylinder part, and the medial surface contacted said base, and the screw formation section which can be screwed in said lock member prepared outside this flange. Fixed installation reinforcement can be raised by preparing a flange.

[0023] Furthermore, when the piece concave opened to the inner circumference side is prepared in the inner edge of said lock member and the inside and said flange of this piece concave contact, it is characterized by being constituted so that the deviation actuation beyond it of said lock member may be regulated.

[0024] Moreover, it is characterized by forming the circular sulcus between said flange and said screw formation section. According to this means, screw processing for preparing the screw formation section can be performed easily, without being barred by the flange.

[0025] Next, the pocket device of this invention has the carbon button structure of a publication in one of the above. As a pocket device which has such carbon button structure, watch, such as a wrist watch, a pocket watch, and a multifunctional clock, stop watch, diver ZUKON pewter, a cellular phone, a pager, a personal digital assistant, etc. are mentioned.

[0026] [Embodiment of the Invention] Next, the operation gestalt of the pocket device equipped with the carbon button structure and this which start this invention with reference to an accompanying drawing is explained to a detail. Drawing 2 is the outline sectional view showing typically the whole watch (wrist watch) 20 configuration which is the pocket device of this operation gestalt. Movement 20M and display 21D are built in the interior of the case object with which watch 20 consists of a drum (clock housing) 21 and a back lid 29 with which it was attached in this, and wrap display window 21T are attached possible [ fluoroscopy of this display 21D ].

[0027] Through tube 21a is formed in the flank of a drum 21, and the lateral part of this through tube 21a has become diameter expansion hole 21b. It is attached in this through tube 21a directly [ the pipe member 22 equivalent to the above-mentioned holddown member, the carbon button member 24, and the lock member 26 ], or indirectly.

[0028] Drawing 1 is the sectional view showing more the carbon button structure of this operation gestalt prepared in the above-mentioned watch 20 in a detail. Here, drawing 1 (a) is the expanded sectional view showing the normal state in which button grabbing is possible, and

drawing 1 (b) is the expanded sectional view showing the lock condition that button grabbing was regulated by the lock member 26.

[0029] Inside section 22a which the pipe member 22 was formed in the shape of a cylinder with a stage as a whole, and was inserted in the narrow diameter portion (part currently formed in the innermost part (illustration left-hand side)) of through tube 21a. It was prepared in the outside (illustration right-hand side) of this inside section 22a, was prepared outside at the pan of flange 22b jutted out over the periphery side in the shape of a flange (disc-like), and this flange 22b, and has lateral part 22c projected in diameter expansion hole 21b. Moreover, 22d of circular sulci is formed in the peripheral face between flange 22b and lateral part 22c. The male screw is formed in the peripheral face of lateral part 22c.

[0030] After the pipe member 22 puts in the low ring-like material 23 in annular piece concave 21c prepared in the level difference section of diameter expansion hole 21b of a drum 21 Insert that inside section 21a in through tube 21a, and it is made to be in the condition that piece concave 21c was completely closed by the peripheral face of inside section 21a, and the medial surface of flange 21b, and is joined to the drum 21 by heating in this condition and carrying out melting of the low material 23. Since piece concave 21c is completely closed by flange 22b at this time, the instability of a junction condition and the lack of bonding strength by the low material 23 leaking out are avoidable.

[0031] In addition, by preparing predetermined spacing between the inner circumference part of flange 22b, and lateral part 22c, the 22d of the above-mentioned circular sulci is prepared in order for screw processing for forming a male screw in the peripheral face of lateral part 22c not to be barred by flange 22b.

[0032] The carbon button member 24 is equipped with shank 24a of the shape of a cylinder equipped with packing 24d, and head 24b whose diameter was expanded in the outer edge of this shank 24a. It is inserted in possible [ sliding to the direction of an axis ] within the above-mentioned pipe member 22, and the part projected in the drum 21 is equipped with the snap ring 25, and when this snap ring 25 engages with the inner edge of the pipe member 22, the carbon button member 24 escapes from and comes out of shank 24a outside. Head 24b has inner end-face 24c which consists of an almost annular flat side, among these inside slot 24e is formed inside end-face 24c. Here, opposite arrangement of outer edge surface 22e of the above-mentioned pipe member 22 and the inside slot 24e is carried out mutually, and the elastic member 27 which consists of a coil spring etc. between the outer edge surface 22e concerned and inside slot 24e is held in the state of compression.

[0033] What is necessary is to just be constituted as the above-mentioned elastic member 27, so that the return force may be given to the carbon button member 24 according to the elastic force. Although the coil spring constitutes the elastic member from this operation gestalt, you may be the spring of arbitration, such as a belleville spring, and may be rubber, such as polyurethane rubber.

[0034] The lock member 26 was formed in the shape of a cylinder with a stage as a whole, and is equipped with inside section 26a and lateral part 26b to which the diameter of inside and outside increased rather than this inside section 26a. It is screwing with the male screw which the female screw was formed in the inner skin of inside section 26a, and was formed in the peripheral face of lateral part 22c of the above-mentioned pipe member 22. Lateral part 26b encloses head 24b of the carbon button member 24 from a perimeter, and it consists of conditions of having been pulled out outside so that mist and a big bore might be later had and mentioned from the outer diameter of head 24b of the carbon button member 24 so that head 24b of the carbon button member 24 may be protected. Regulation side 26c of the shape of an almost flat ring which turned to the direction outside of an axis is formed in the level difference section between inside section 26a and lateral part 26b. This regulation side 26c has countered with inner end-face 24c of head 24b of the above-mentioned carbon button member 24.

[0035] Here, inside section 26a of the lock member 26 and lateral part 22c of the pipe member 22 are equipped with the diameter of screwing almost equal to inner end-face 24c of head 24b of the above-mentioned carbon button member 24. And since regulation side 26c of the lock member 26 is evenly formed in the periphery side rather than this diameter of screwing,

regulation side 26c is constituted so that only the part of the direction outside of a path may be contacted among inner end-face 24c of head 24b.

[0036] Moreover, 26d of piece concaves opened to the inner circumference side is formed in a part for the inner circumference flank of toe 26e of the lock member 26. And as shown in drawing 1 (a), it is constituted so that flange 22c of the pipe member 22 may contact to the inside of 26d of this piece concave. Since the deviation actuation beyond it of the lock member 26 is forbidden by the contact to the inside of the 26d of the above-mentioned piece concaves, and flange 22c at this time, that toe 26e contacts the inside of diameter expansion hole 21b of a drum 21.

[0037] Knurling tool 26f is formed in the peripheral face of lateral part 26b of the lock member 26, and it is constituted so that rotation actuation can be simply carried out with a finger etc. The lock member 26 is in the condition of having been deeply thrust to lateral part 22c of the pipe member 22, in the normal state shown in drawing 1 (a). Consequently, since regulation side 26c of the lock member 26 is separated from inner end-face 24c of head 24b of the carbon button member 24 While an elastic member 27 is compressed by pressing head 24b of the carbon button member 24, it is constituted so that the contact spring 28 with which the inner edge of shank 24b was installed in the interior of a projection and a drum 21 inside the drum 21 may be moved.

[0038] If the lock member 26 is rotated and the screwing depth to the pipe member 22 is reduced, since the lock member 26 will move to the direction outside of an axis on the whole and the regulation side 26c will approach inner end-face 24c of head 24b of the carbon button member 24, press actuation of the carbon button member 24 is regulated. It will be in the lock condition which is not made at all by pulling out the lock member 26 to carry out press actuation of the carbon button member 24 until regulation side 26c of the lock member 26 contacts inner end-face 24c of a head 24, as especially shown in drawing 1 (b).

[0039] In this operation gestalt explained above, the elastic member 27 which demonstrates the return force (force for returning to the original location when the carbon button member 24 is pressed) of the carbon button member 24 is held between outer edge surface 22e of lateral part 22c of the pipe member 22, and inside slot 24e of head 24b of the carbon button member 24. Therefore, also in any of the normal state shown in drawing 1 (a), and the lock condition shown in drawing 1 (b), a change will be in the compression condition of an elastic member 27, and unless button grabbing is carried out, even if it moves the lock member 26 to which location, it will not be compressed more by the elastic member 27. therefore, since the stress burden to an elastic member 27 is reduced while it becomes possible to hold the elasticity of an elastic member 27 uniformly for a long period of time and it can raise the endurance of carbon button structure, since it will always be compressed by only button grabbing in the fixed condition, an elastic member 27 can continue at a long period of time, and can keep operability good. Moreover, since the thrust at the time of button grabbing does not change even if the location of the lock member 26 changes, the operability itself can be raised.

[0040] Moreover, in this operation gestalt, since it can assemble only by [ it becoming unnecessary to make an elastic member 17 guide to 16d of toes like structure before and making an elastic member 27 insert in shank 24a of the carbon button member 24 ] being shown in drawing 3 , it becomes easy to carry out assembly operation.

[0041] Moreover, in this operation gestalt, since it is in a path location almost equal to inner end-face 24c by which the path location of the screwing part of the pipe member 22 and the lock member 26 was established in the periphery side of head 24b of the carbon button member 24, the diameter of screwing of the pipe member 22 and the lock member 26 can be enlarged conventionally (if it compares with structure conventionally on the basis of the outer diameter of head 24b of the carbon button member 24). Consequently, the overall length of the direction of an axis of carbon button structure can be shortened, securing the rigidity of a screwing part, and the stroke of the carbon button member 24 of operation, since sufficient screwing die length (die length which met the spiral with which screw threads have geared) is fully securable even if it shortens axis lay length of the male screw of lateral part 22b of the pipe member 22, and the female screw of inside section 26a of the lock member 26. Moreover, the reinforcement of

carbon button structure can be sharply raised by increase of the diameter of screwing, and compaction of an overall length. Furthermore, since it becomes easy to make rotation of the lock member 26 more smooth according to increase of the diameter of screwing, the operability over a lock member can be raised.

[0042] Furthermore, since it consists of these operation gestalten so that regulation side 26c of the lock member 26 may contact a part of inner end-face 24c of head 24b of the carbon button member 24, i.e., the part by the side of a periphery, in order to cancel the perfect lock condition shown in drawing 1 (b), the actuation torque at the time of thrusting the lock member 26 from an illustration condition can be reduced. That is, the feeling of actuation at the time of discharge of the lock condition of the lock member 26 can be made light. Here, since it becomes unnecessary to prepare a level difference between the direction outer edge of an axis of the female screw of the lock member 26, and regulation side 26c since the path of the screwing part of the pipe member 22 and the lock member 26 is formed as mentioned above almost equally to the path location of inner end-face 24c of the carbon button member 24 in order to limit the contact range of regulation side 26c and inner end-face 24c as mentioned above, the overall length of carbon button structure can be shortened further. That is, the dimension of L shown in drawing 3 of the conventional technique can be shortened.

[0043] Moreover, since low attachment is performed after piece concave 21c has been completely closed by inside section 22a and flange 22b of the pipe member 22 with this operation gestalt, while being able to prevent exsorption of the low material at the time of low attachment and being able to stabilize a junction condition, bonding strength and waterproofness can be raised.

[0044] Furthermore, in this operation gestalt, since the carbon button member 24 and the lock member 26 can be removed easily, the activity at the time of a maintenance etc. becomes easy.

[0045] In the above-mentioned operation gestalt, since 26d of piece concaves is prepared in the inner circumference side of toe 26e of the lock member 26, the stroke of the carbon button member 24 of operation can be secured, without avoiding this and increasing the overall length of the direction of an axis of carbon button structure, even if flange 22b of the above-mentioned pipe member 22 exists. Moreover, since the lock member 26 is constituted so that the inside of the 26d of the above-mentioned piece concaves may contact flange 22b, and it is constituted so that the inside in diameter expansion hole 21b of a drum 21 may not be contacted, even if it forms the lock member 26 in the direction of a path thickly, the increment in the actuation torque at the time of lock actuation initiation of the lock member 26 by contact area with a drum 21 becoming large is avoidable. Furthermore, since 26d of piece concaves is formed in the inner circumference side of toe 26e of the lock member 26 in this case and toe 26e of the lock member 26 stops easily being able to come out of diameter expansion hole 21b in the lock condition shown in drawing 1 (b), an appearance design can be kept good.

[0046] In addition, as for the pocket device equipped with the carbon button structure of this invention, and this, it is needless to say that modification can be variously added within limits which are not limited only to the above-mentioned example of illustration, and do not deviate from the summary of this invention. For example, although it constitutes where the pipe member 22 which is equivalent to a holddown member to the drum 21 equivalent to a base is joined, the drum 21 and the pipe member 22 in the above-mentioned operation gestalt may consist of above-mentioned operation gestalten as a base of one, without preparing a holddown member separately.

[0047] Moreover, the pocket device of this invention can be used for various pocket devices, such as not only the above-mentioned watch but a multifunctional clock, stop watch, a diving computer, a cellular phone, a pager, a personal digital assistant, etc.

[0048]

[Effect of the Invention] As mentioned above, as explained, according to this invention, the operability of the carbon button structure of having a lock function can be raised.

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[Translation done.]

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the expanded sectional view (b) showing the expanded sectional view (a) and lock condition which show the normal state in the operation gestalt of the carbon button structure concerning this invention.

[Drawing 2] It is the outline sectional view showing the whole watch configuration of this operation gestalt typically.

[Drawing 3] It is the expanded sectional view showing the conventional carbon button structure.

[Description of Notations]

- 20 Watch
- 21 Drum
- 21a Through tube
- 21b Diameter expansion hole
- 21c Piece concave
- 22 Pipe Member
- 22a Inside section
- 22b Flange
- 22c Lateral part
- 22d Concave section
- 22e Outer edge surface
- 23 Low Material
- 24 Carbon Button Member
- 24a Shank
- 24b Head
- 24c Inner end face
- 24d Packing
- 24e Concave
- 25 Snap Ring
- 26 Lock Member
- 26a Inside section
- 26b Lateral part
- 26c Regulation side
- 26d Piece concave
- 26e Toe
- 26f Knurling tool
- 27 Elastic Member
- 28 Contact Spring
- 29 Back Lid

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[Translation done.]